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In support of these views he gives the well-known figures of Huxley showing the skeletons of man and the four anthropoid apes, and also the remarkable series of embryos arranged by Haeckel to show the phylogeny and ontogeny of man. This series first appeared in Haeckel's *Anthropogenie*, 1874, pl. v. It has been copied many times, and our author, who does not seem to be acquainted with Haeckel's work, borrowed it from Romanes (*Darwin and after Darwin*, pp. 152-153).

The general reflections in which the author indulges growing out of these and other facts adduced in favor of human evolution, show a strong coördinating power and a broad view of his subject. The rôle of the higher mind is clearly grasped, and its bearing on the future of evolution, both favorable and unfavorable, is well set forth. Perhaps he somewhat exaggerates the tendency of civilization to preserve the biologically unfit, but he may be pardoned, for this is a favorite theme of modern biological philosophers, many of whom are so carried away by it that they lose all sense of perspective and become wholly pessimistic. Not so our author, although he sounds the note of warning. But he sees, as many do not, that intelligence exempts mankind for the most part from the principle of selection, and enables him to control and transform his environment, instead of being controlled and transformed by it. "We can," he says "to a considerable extent, control our own evolution. The lower animals cannot do so. They lack the intelligence which gives us this power." But he seems to share with Galton, Ribot, and others the faith that whatever progress is to be brought about through intelligence must consist in some sort of rational stirpiculture or "eugenics," and be exclusively physiological. The idea of a strictly social evolution, as distinguished from biological evolution, seems to be outside the range of his studies.

LESTER F. WARD.

An Introduction to the Theory of Mental and Social Measurements. By EDWARD L. THORNDIKE. New York: The Science Press. 1904. 8°, xii, 210 pages.

The author claims this book to be a statement of the first principles and rules of procedure in the treatment of statistical data, to serve as a handbook for the students of all sciences using statistical material. Yet it is obvious, on looking into the special methods discussed, that the treatise is expressly for the students of education and psychology. The apparent design of the work is to present methods of procedure based on mathematical conceptions with the mathematics left out, the author himself being fully conscious of the awkwardness of his position. Since methods

of handling statistics for variable phenomena are of special interest to physical anthropology, an application of methods to similar conditions in other fields of investigation will always deserve attention. All statistical work in variation proceeds on the assumption that variation is the result of a large number of independent causes working independently, the probabilities of their acting and not acting being equal. Such a condition gives a distribution of cases expressed by the binomial formula. Whenever it can be established that anatomical measurements for a homogeneous people follow the same law, mathematics will be of great service and new fields of research will present themselves. Physical anthropology has firmly established itself by empirically demonstrating the correspondence between the observed facts and this mathematical expression. However, the great obstacle to research has been the general ignorance of mathematics on the part of the workers, self-justified by traditions against the use of its methods.

While the psychologists have been using the same mathematical methods, they have not yet demonstrated in the same rough fashion the correspondence between their data and the binomial formula, or the more general expression of the exponential formula. The author devotes much space to the presentation of types of distribution obtained in the various kinds of data to give the student some idea of the basis for the assumption of the applicability of the mathematical formulas that hold for the conditions of a single type of distribution. This is commendable and safe ground, but merely states observations. The critical reader of the book must feel that the advice of the author to regard every distribution as being of the symmetrical type unless there is good reason for not doing so would rule out the remainder of the book, since, as far as can be judged by eye, the majority of the plotted distributions show asymmetrical tendencies. This will doubtless serve the good purpose of making the student duly cautious in the use of the method. The weakness of the author's position is in his failure to give a satisfactory basis for the determination of asymmetry. The question of the type of distribution would have come to something more definite if the relation between the higher powers of the deviations and the type of distribution had been discussed. As it is, the whole preliminary discussion fails to suggest a way out of seemingly hopeless diversity of forms of distribution.

The book must be estimated as an exposition of established methods rather than as a contribution to the knowledge of the subject. To this end the author has chosen a few main points and treated them at length. The illustrative examples are original, and although sometimes a little

strained seem to serve their purpose: *e. g.*, John's Christmas money, the relative probability of his receiving a dollar from different sources, is carried through the entire chapter on the cause of variability.

Some useful adaptations of principles are worked out by the author as special methods of procedure in psychological research: *i. e.*, the transmutation of relative measures into those of quantity. The author's discussion of the zero point of a series seems unnecessarily confusing; in this as in several other instances he gives the reader the impression that he is in too great haste to get to the end. The standard deviation is represented in the exponential formula by μ and in the text by σ ; as this occurs on the same page without explanation it will confuse the student. The distinction between the mode and the average is dwelt upon at length, but it would have been more emphatic if a brief mathematical demonstration had been added. In the treatment of accuracy of measurements the student should have been given the simple formula for the correction of the standard deviation. These are some of the instances in which the author's fear of mathematics led him to eliminate matter that is really useful to the reader even though he must take its verity on faith.

The appearance of the book is an encouraging sign that psychology may be about to begin substantial advance in one important part of its field. As a text book for a preparatory course to psychological investigation it has many points of excellence, but the author's hope that it will be of great service to the unmathematical reader is not well grounded, for it is the experience of the reviewer that even such a presentation reaches only the mathematically inclined.

CLARK WISSLER.

Notes d'archéologie préhistorique. — Nos ancêtres primitifs. Par A. DOIGNEAU. Preface par le Docteur Capitan. Paris: Librairie C. Clavreuil. 1905. 8°, 202 pages, 109 figures.

This volume is very well characterized by the author in the dedication as "a work of popularization"; and again by Dr Capitan in the preface as "a concise résumé of the history of our primitive ancestors." Turning to the table of contents, the history is found to be limited to the chapters dealing with the ages of stone. Such a work marks a timely step in the right direction. The domain of prehistoric archeology is a broad one. The period of pioneering has therefore of necessity been long. But there comes a time in the development of a science, as in that of a country, when the trail should give place to the highway. There are those who will always prefer the trail. Let them still wander to their heart's content through the wilderness. Their course leads by way of the numerous